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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/626,658	07/25/2003	Yukihiko Furumoto	826.1884	1396

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STAAS & HALSEY LLP
SUITE 700
1201 NEW YORK AVENUE, N.W.
WASHINGTON, DC 20005

EXAMINER	
HAJNIK, DANIEL F	
ART UNIT	**PAPER NUMBER**
2628	

SHORTENED STATUTORY PERIOD OF RESPONSE	MAIL DATE	DELIVERY MODE
3 MONTHS	01/24/2007	PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

If NO period for reply is specified above, the maximum statutory period will apply and will expire 6 MONTHS from the mailing date of this communication.

Office Action Summary	Application No.	Applicant(s)	
	10/626,658	FURUMOTO ET AL.	
	Examiner	Art Unit	
	Daniel F. Hajnik	2628	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *10/30/2006*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1,4-6 and 9-12* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1,4-6 and 9-12* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *07 March 2006* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☒ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

Continued Examination Under 37 CFR 1.114

1. A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on 10/30/2006 has been entered.

Claim Objections

2. Claims 1 and 6 are objected to because of the following informalities: In lines 17-18 of claim 1 and in lines 16-17 in claim 6, the phrase "which are too unnaturally discontinuous to reflect a real world and are caused" is grammatically incorrect. Please fix to: i.e. "which are too unnaturally discontinuous to reflect a real world change and are caused" Appropriate correction is required.

Claim Rejections - 35 USC § 101

1. 35 U.S.C. 101 reads as follows:

> Whoever invents or discovers any new and useful process, machine, manufacture, or composition of matter, or any new and useful improvement thereof, may obtain a patent therefor, subject to the conditions and requirements of this title.

Claims 6, 9, 10, and 12 are rejected under 35 U.S.C. 101 because the claimed invention is directed to non-statutory subject matter. That is, the claims are directed to a program, which is a data structure, per se. Data structures not claimed as embodied in computer-readable media are descriptive material per se and are not statutory because they are not capable of causing

functional change in the computer. Such claimed data structures do not define any structural and functional interrelationships between the data structure and other claimed aspects of the invention which permit the data structure's functionality to be realized. In contrast, a claimed computer-readable medium encoded with a computer program to execute instructions defines structural and functional interrelationships between the data structure and the computer software and hardware components which permit the data structure's functionality to be realized, and is thus statutory.

To expedite a complete examination of the instant application, the claimed rejected under 35 U.S.C. 101 as non-statutory subject matter are further rejected as set forth below in anticipation of applicant amending the claims to place them within the four categories of invention.

Claim Rejections - 35 USC § 103

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

2. Claims 1, 5, 6, and 10 are rejected under 35 U.S.C. 103(a) as being unpatentable over Gadh et al. (US Patent 6629065, herein referred to as "Gadh") in view of Funkhouser et al. (NPL Document "Adaptive Display Algorithm for Interactive Frame Rates During Visualization of Complex Virtual Environments", herein referred to as "Funkhouser").

As per claim 1, Gadh teaches the claimed:

An animation creating/editing apparatus *(col 16, lines 24-26, "The VDSF allows a user to design (i.e., create, edit, visualize, and manipulate) objects, including extremely complex objects, very rapidly in a three-dimensional VE")*, comprising:

a three-dimensional model *(col 21, lines 42-43, "the geometric model")* storing unit storing an object configuring an image of an animation as three-dimensional model information *(col 16, lines 47-50, "(a) In a Design Intent Graph (D graph), which stores the faceted primitive elements that are combined to assemble a design, and additionally stores the hierarchy in which these elements were combined")*, wherein the three-dimensional model information has a tree structure *(col 22, line 46, "D for the above examples is a tree structure")* configured by a plurality of hierarchies *(col 10, lines 36-39, "(2) the parent-child hierarchy of the elements within the design")* which represent constraint conditions *(col 10, lines 39-42, "(3) any user-specified or system-specified design constraints on the elements or their relationships (e.g., two elements are to be spaced apart by some specified distance, etc")* of the three-dimensional model, and each of the hierarchies are composed of plural nodes *(col 10, lines 65-67, "Node/element information includes information such as the shapes)* which represent position/direction and shapes information of the three dimensional model *(figure 19, figures 20A, 20B, 21A, and 21B)* ;

an operation instruction editing unit creating/editing an operation instructions sequence *(col 16, lines 24-26, "The VDSF allows a user to design (i.e. create, edit, visualize, and manipulate)*

objects, including extremely complex objects") for creating/editing an animation *(col 20, lines 66-67, "modeling and graphical rendering of created models")* wherein the operation instructions sequence comprises object operation instructions *(col 18, lines 41-42, "so that the user is able to pick and place objects in a natural fashion")* and eye point operation instructions *(col 18, lines 21-22, "The Interaction Component provides different methods of navigation in 3D space").*

an interference detecting unit detecting an occurrence of interference between objects based on position/direction and shape information of the three-dimensional model information, which is caused by executing the object operation instruction; *(col 22, lines 52-56, "While the constrained location and alignment commands provide a quick way to position shape elements, the bounding box-based intersection checks provide the ability to detect potential collisions between elements")*

an interference avoiding unit generating an object operation instruction to avoid the interference, if the occurrence of the interference is detected by said interference detecting unit; *(also in col 22, lines 52-56, where it is inherent that at least one instruction will be generated in response to the detection of an interference, because Gadh teaches of the ability to detect potential collisions)*

Gadh does not explicitly teach the remaining claimed limitations.

Funkhouser teaches the claimed:

a discontinuity detecting unit detecting an occurrence of discontinuous scenes *(middle of 2nd col on page 252, "The Feedback algorithm adjusts the size threshold for LOD selection adaptively in an effort to maintain a uniform frame rate", in this instance, the examiner is interpreting discontinuity to mean a jump in the animation of the movement of the object, such a jump or discontinuous movement can be due to a frame too low for the animation movement)*, which are too unnaturally discontinuous to reflect a real world *(top of 2nd col on page 247, "It is important for a visualization system to maintain an interactive frame rate (e.g. a constant ten frames per second). If frame rates are too slow, or too jerky, the interactive feel of the system is greatly diminished")* and are caused by executing the eye point operation instruction *(figure 6 which shows the path of the observer viewpoint, in this instance, the discontinuous scenes are caused by movement of the user's viewpoint too quickly around the scene and objects, such quick movement can cause the frame rate to drop too low, due to performance constraints, and thus produce discontinuous movement. Funkhouser addresses this problem by making adjustments to the animation to keep a high frame rate and thus avoid discontinuities)* or the object operation instruction;

a complementary instruction generating unit generating an object operation instruction or an eye point operation instruction to generate a scene which complements between the discontinuous scenes, if the occurrence of the discontinuous scenes is detected by said discontinuity detecting unit *(middle of 2nd col on page 252, "The Feedback algorithm adjusts the size threshold for LOD selection adaptively in an effort to maintain a uniform frame rate. This algorithm generates a fairly uniform frame rate in situations of smoothly varying scene complexity" where the smooth animation with an increased frame rate generates the scene between discontinuities).*

It would have been obvious to one of ordinary skill in the art at the time of invention to combine Gadh and Funkhouser. Funkhouser teaches one advantage of the combination by teaching of "It is important for a visualization system to maintain an interactive frame rate (e.g. a constant ten frames per second). If frame rates are too slow, or too jerky, the interactive feel of the system is greatly diminished" (top of 2nd col on page 247).

As per claim 5, Gadh teaches the claimed:
an editing rule storing unit *(col 23, lines 3-5, "Another role of D is to store the design rules/constraints specified by the designer while creating the design")* storing editing rules for editing the object operation instructions sequence when an object operation instruction is inserted/deleted/moved in/from/within the operation instruction sequence, when an animation is edited; *(col 20, lines 13-17, "Given that exact location and editing of shapes in three dimensions is difficult, the Design Editing Layer provides various types of constraints (design rules) that allow simplification of interactive placement and shape modification")*

an operation instruction editing unit referencing the editing rules, and preventing/avoiding an operation if the operation for inserting/deleting/moving an object operation instruction which violates the editing rules in/from/within the operation instruction sequence is performed *(col 20, lines 34-36, "Another implicit constraint, non-obstruction of predefined negative elements, is illustrated in FIG. 13, where the designer is not allowed to move rib r.sub.5 to obstruct hole (negative element) h.sub.4")*

As per claims 6 and 10, these claims are similar in scope to claims 1 and 5, respectively, and thus are rejected under the same rationale.

3. Claims 4, 9, 11 and 12 are rejected under 35 U.S.C. 103(a) as being unpatentable over Gadh in view of Funkhouser in further view of Kondo (US Patent 6812924).

As per claim 4, Gadh teaches the claimed:

the three-dimensional model information holds a constraint condition between objects which is represented such that a node in a lower hierarchy of the three-dimensional model information is constrained by a node in a higher hierarchy; *(col 23, lines 23-29, "While the links in D capture the parent/child hierarchy of shape elements and any design constraints concerning the elements, the nodes contain additional geometric information")*

wherein an unconstrained object is freely moved as far as it does not interfere with another object, and, a constrained object having a predetermined movable range is moved within said movable range as far as it does not interfere with another object *(col 28, line 66 – col 29, line 2, "More often than not, the designer will not want the rib to intersect any other feature on the block ... he/she will generally not want one to 'pierce' the other; preventing the piercing requires moving the object without causing interference")*

Gadh does not explicitly the remaining limitation. Kondo teaches the claimed:

a constraint detecting unit detecting an object operation instruction which violates the constraint condition as an error is further comprised, *(col 11, lines 52-58, "An analytic surface fit error can be detected ... The interference computation data select module 8 specifies the analytic surface 111 containing an error" where the interference is associated with enforcing and checking a constraint condition)*.

It would have been obvious to one of ordinary skill in the art at the time of invention to combine Gadh, Funkhouser, and Kondo. One advantage of the using the claimed error condition feature is to better communicate design problems to the user.

As per claim 11, Gadh teaches the claimed:

an object operating unit operates an object in a virtual space upon receipt of an input of an object operation instruction from a user, *(col 16, lines 30-32, "(1) An Interaction Mechanisms Layer (or User Interaction Layer), which allows the user/designer to interact with the VDSF via input/output devices")*

the interference detecting unit checks the interference between objects which accompanies the operation; *(col 29, lines 7-11, "Ideally, such intersections should be detected in real-time so that graphical computation of the edited geometry and visual feedback to the designer can be (practically) instantaneously provided")*

when the interference occurs, the interference avoiding unit modifies a move direction of an object to a direction where the interference is resolved, so that the interference is avoided;

(col 29, lines 5-7, "Once an intersection is detected in VDSF, the designer may choose to allow or disallow the intersection, and D and S are appropriately updated")

when an object can be moved without causing interference, the object operation instruction is stored in a corresponding instruction sequence within the operation instruction storing unit via the instruction sequence selecting unit; *(col 28, line 66 – col 29, line 2, "More often than not, the designer will not want the rib to intersect any other feature on the block; the designer may want it to attach to another element ... but he/she will generally not want one to 'pierce' the other; preventing the piercing requires moving the object without causing interference")*

the object operating unit performs a constraint deletion operation for an object by an operation for removing an object from a tree to which the object belongs to, and the object is released from the constraint of a parent object *(col 29, lines 5-7, "Once an intersection is detected in VDSF, the designer may choose to allow or disallow the intersection, and D and S are appropriately updated" where allowing the intersection will delete the constraint between the objects that are interfering or colliding)*

Gadh does not explicitly teach the remaining claim limitation. Kondo teaches the claimed: when the interference cannot be avoided, the object operation instruction becomes an error; *(col 11, lines 52-58, "An analytic surface fit error can be detected ... The interference computation data select module 8 specifies the analytic surface 111 containing an error, and selects initial shape data of polyhedron approximation corresponding to this analytic surface 111").*

It would have been obvious to one of ordinary skill in the art to combine this teaching of Kondo with Gadh and Funkhouser. The motivation of claim 4 is incorporated herein.

As per claims 9 and 12, these claims are similar in scope to claims 4 and 11, respectively, and thus are rejected under the same rationale.

Response to Arguments

4. Applicant argues that Gadh does not automatically generate an instruction sequence to avoid the interference (bottom of page 6 of remarks and top of page 7 of remarks). Gadh teaches of detecting intersections by teaching of "While the constrained location and alignment commands provide a quick way to position shape elements, the bounding box-based intersection checks provide the ability to detect potential collisions between elements" (col 22, lines 52-56). The examiner, respectfully, maintains that the prior art limitation of generating instructions to avoid interference is inherent in the teachings of Gadh. For instance, one of ordinary skill in the art would not create an interference detection unit without having at least one instruction generated in response to a detected interference; otherwise the interference detection would not have any use. In other words, there has to be an instruction output in response to detecting an interference for the system, otherwise the interference would neither be detected by the system nor allow the user to act in response to the instruction.

Applicant's remaining arguments with respect to the claimed discontinuity detecting unit have been considered but are moot in view of the new ground(s) of rejection.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Daniel F. Hajnik whose telephone number is (571) 272-7642. The examiner can normally be reached on Mon-Fri (8:30A-5:00P).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Ulka J. Chauhan can be reached on (571) 272-7782. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Daniel Hajnik

DFH

U Chauhan

ULKA CHAUHAN
SUPERVISORY PATENT EXAMINER